

What is claimed is:

1. A fluid filter arrangement (20, 140, 300, 300') comprising:
  - (a) a housing (22, 166, 304, 304') having a wall (28", 172, 308) defining a closed end (30, 174, 310), an open end (32, 176), an interior volume (44), and an inwardly extending ledge (126, 180, 318, 318');
    - (i) the housing including a threaded region (86, 178, 316, 316') adjacent to the open end;
    - (ii) the inwardly extending ledge (126, 180, 318, 318') being circumferential and extending completely along an internal surface of the housing wall;
      - (A) the inwardly extending ledge (126, 180, 318, 318') being located between the closed end and the threaded region (86, 178, 316, 316');
  - (b) a filter cartridge (24, 168, 306, 306') oriented within said interior volume of said housing; said filter cartridge including a tubular construction of filter media defining an open filter interior;
    - (i) said tubular construction of filter media (46, 190, 328) having a first end;
    - (ii) said filter cartridge includes an end cap (54, 192, 324, 324') secured to said first end of said tubular construction of filter media; said end cap defining an aperture in fluid communication with said open filter interior;
  - (c) a projection arrangement (100, 210, 350, 400) constructed and arranged to space said filter cartridge from said housing wall to define a fluid flowpath between said filter cartridge and said housing wall;
    - (i) the projection arrangement includes a base (96, 212, 354, 404) and a sidewall (98, 214, 356, 406);
    - (ii) said projection arrangement comprising at least one projection (110, 220, 362, 410) in extension from at least one of said base and said sidewall;
    - (iii) the projection arrangement engaging the inwardly extending ledge (126, 180, 318, 318') to space said filter cartridge from

said housing wall to define a fluid flowpath between said filter cartridge and said housing wall.

2. A fluid filter arrangement according to claim 1 wherein:
  - (a) said projection arrangement includes a plurality of projections.
3. A fluid filter arrangement according to claim 2 wherein:
  - (a) each of said projections (110, 362, 410) extends axially to engage said housing.
4. A fluid filter arrangement according to any one of claims 2 and 3 wherein:
  - (b) said base (404) and said sidewall (406) are part of a plate (402) that is a separate piece from said end cap (324').
5. A fluid filter arrangement according to any one of claims 2 and 3 wherein:
  - (a) said base (96, 212, 354) and said sidewall (98, 214, 356) are part of said end cap (54, 192, 324).
6. A fluid filter arrangement according to claim 4 wherein:
  - (a) each of said projections (110, 362, 410) extends axially from said sidewall (98, 356, 406) of said endcap (54, 324, 324').
7. A fluid filter arrangement according to claim 6 wherein:
  - (a) said sidewall includes a media-containing portion (99, 360) that forms a continuous wall (98, 356) around said filter media;
    - (i) said media-containing portion (99, 360) extending from said base (96, 354) and having an end (114, 368);
    - (A) each of said projections (110, 362) being in extension from said end of said media-containing portion.
8. A fluid filter arrangement according to anyone of claims 2-7 wherein:
  - (a) each of said projections (110, 220, 362, 410) includes a free end;
    - (i) each free end of said projections engaging the inwardly extending ledge (126, 180, 318, 318').

9. A fluid filter arrangement according to claim 2 wherein:
- (a) each of said projections (221, 222, 223) extends radially to engage the inwardly extending ledge (180).
10. A fluid filter arrangement according to claim 9 wherein:
- (a) each of said projections (221, 222, 223) extends radially from said base (212) of said endcap (192).
11. A fluid filter arrangement according to claim 10 wherein:
- (a) said sidewall (214) includes a media-containing portion (216) that forms a continuous wall (218) around said filter media;
    - (i) said media-containing portion extending from said base (212); and
    - (ii) said projections (221, 222, 223) being generally orthogonal relative to said media-containing portion.
12. A fluid filter arrangement according to any one of claims 1-8 wherein:
- (a) a portion (323) of the housing wall adjacent to the filter media defines an internal diameter about equal to an internal diameter of the housing wall between the threaded section and the internally extending ledge (318, 318');
    - (i) between the internally extending ledge (318, 318') and the portion (323) is a region of the housing wall having an internal diameter greater than the internal diameter of the portion to form a relief (380);
      - (A) the relief (380) allowing the projection arrangement (350, 400) to spring back to a normal position.
13. A fluid filter arrangement according to any one of claims 2-12 wherein:
- (a) said filter media includes pleated media and a second end opposite of said first end;
  - (b) said end cap is a first end cap; and
  - (c) said filter cartridge further includes:

- (i) a second end cap secured to said second end of said filter media;
  - (A) said second end cap being closed; and
  - (ii) an inner tubular liner circumscribed by said pleated media;
  - (A) said inner tubular liner extending between said first end cap and said second end cap.
- 14. A filter assembly comprising a fluid filter arrangement according to any one of claims 1-13; the filter assembly comprising:
  - (a) a filter head having a fluid flow inlet port and fluid flow outlet port; and
  - (b) the filter arrangement is releasably secured to said filter head.
- 15. A method of making a filter; the method comprising:
  - (a) inserting a filter cartridge (24, 168, 306, 306') and a projection arrangement into an open end of a housing; and
  - (b) engaging projections on the projection arrangement (100, 210, 350, 400) against a portion of the housing to secure the filter cartridge in the housing;
    - (i) the portion of the housing including an inwardly extending circumferential ledge (126, 180, 318, 318') extending completely along an internal surface of the housing; and
    - (ii) the engagement of the projection arrangement is against a side of the ledge directed to a closed end of the housing.
- 16. A method according to claim 15 wherein:
  - (a) the filter cartridge (24, 168, 306) includes an end cap (54, 192, 324) having the projections extending therefrom; and
  - (b) said step of engaging includes engaging the projections (110, 220, 362) from the end cap against the inwardly extending ledge (126, 180, 318) of the housing.
- 17. A method according to claim 15 wherein:

- (a) said step of inserting includes inserting a filter cartridge (306') and then inserting a separate plate (402) into the open end of the housing;
  - (i) the separate plate (402) including the projecting arrangement (400).

18. A method according to any one of claims 15-17 wherein:

- (a) said step of inserting includes snapping the projections over a radial protrusion in the housing; and
- (b) said step of engaging includes engaging the projections against the radial protrusion.

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